

CLAIMS

1. A polymer foam obtained by highly concentrated internal phase emulsion polymerization, which is formed from a crosslinked, exclusively hydrocarbon, polymer based on styrenic monomers, and has a density of 40 mg/cm³ to 260 mg/cm³ and cells with a mean diameter of 10 micrometers or less.

2. The polymer foam as claimed in claim 1, in which the polymer is a styrene/divinylbenzene copolymer.

3. The polymer foam as claimed in claim 2, in which the styrene/divinylbenzene weight ratio is between 5 and 1.

4. The polymer foam as claimed in claim 1, which has a mean cell diameter of between 1 and 5 micrometers.

5. The polymer foam as claimed in claim 1, in which the elements other than the constituent carbon and the constituent hydrogen of the polymer represent less than 3% by weight of the weight of the foam.

6. A process for the manufacture of a polymer foam as claimed in claim 1, which comprises the following steps:

a) an emulsion between an organic phase, comprising exclusively hydrocarbon styrenic monomers

and a surfactant, and an aqueous phase, comprising an electrolyte and a polymerization initiator, is produced, the volume of the aqueous phase representing at least 74% of the total volume of the two phases;

5 b) the emulsion is subjected to shear in order to reduce the diameter of the water bubbles that it contains;

 c) said monomers are polymerized until a solid foam is obtained; and

10 d) the foam obtained in step c) is washed and dried.

7. The process as claimed in claim 6, in which the styrenic monomers present in the organic
15 phase are styrene and divinylbenzene monomers.

8. The process as claimed in claim 7, in which the weight ratio of the styrene monomers to the divinylbenzene monomers is between 5 and 1.
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9. The process as claimed in claim 6, in which the styrenic monomers represent from 50 to 80% by weight of the weight of the organic phase.

25 10. The process as claimed in claim 6, in which the surfactant is diglyceryl monooleate.

11. The process as claimed in claim 6, in which the surfactant represents from 13 to 20% by
30 weight of the weight of the organic phase.

12. The process as claimed in claim 6, in which the electrolyte is aluminum sulfate.

13. The process as claimed in claim 6, in
5 which the electrolyte represents from 0.05 to 2% by weight of the weight of the aqueous phase.

14. The process as claimed in claim 6, in which the polymerization initiator is sodium
10 persulfate.

15. The process as claimed in claim 6, in which the polymerization initiator represents from 0.1 to 2% by weight of the weight of the aqueous phase.

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16. The process as claimed in claim 6, in which the water used for preparing the aqueous phase is water having a resistivity of about 18.2 megaohms.

17. The process as claimed in claim 6, in
20 which step b) is carried out by injecting the emulsion into a container by means of a syringe connected to a pulser capable of delivering a pressure above atmospheric pressure.

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18. The process as claimed in claim 17, in which the container is a mold having the shape and the dimensions of the foam that has to be manufactured.

19. The process as claimed in claim 17, in which the syringe is provided with a needle having an internal diameter of 150 μm to 1 mm.

5 20. The process as claimed in claim 6, in which the polymerization of the monomers is carried out at a temperature of around 30 to 70°C.

10 21. The process as claimed in claim 6, in which the washing of the foam comprises one or more operations of immersing this foam in water, followed by one or more operations of immersing it in an alcohol, which are themselves followed by one or more alcohol extraction operations.

15 22. The process as claimed in claim 6, in which the foam is dried in an oven at a temperature of about 60°C.